bonium ions (which are mentioned in passing without any evidence for their existence or discussion of their role in chemistry). No mention is made of recent work on the relation between the S_N1 and S_N2 mechanisms, on ion pairs, on the S_N2' mechanism, or even on the relation between structure and reactivity. Similar criticisms could be made of the chapters that deal with other reactions. Even more surprising is the lack of any numerical data; the only reaction rates quoted in the book are some partial rate factors for nitration of substituted benzenes (p. 199)—and these are from the older literature and have been mostly superceded.

However, despite its shortcomings, this book does give a very clear outline of the subject, and, for this reason, it may prove useful to students.

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Microscopy and Biology

Electron Microscopic Anatomy. Stanley M. Kurtz, Ed. Academic Press, New York, 1964. xii + 425 pp. Illus. $14.

This volume consists of a collection of 15 articles by American and European specialists who describe the fine structure of many of the more investigated mammalian tissues. It includes little on blood vessels and leaves out both principal and accessory tissues of the genital and respiratory systems, the skin, the teeth, the eye, the ear, and several endocrine glands. Throughout there has been little attempt to integrate the information presented in the chapters, to develop particular concepts, or to trim away repetition. For example, about half of the 13 sections on materials and methods are fairly long; it might have been better to discuss methods once.

The chapters are independent and must be considered separately. Each begins with an introductory outline and ends with a list of references. The book has only an author index. The form of the articles is somewhere between that of a research report and that of a review. Most of the articles are new; a few were published earlier, in longer versions, but all have been competently written. The chapters are enlivened by the inclusion of controversial material, just as they are dulled by the repetition of such concepts as the packaging function of the Golgi apparatus, the protein-making function of the ribosomes, and the unit membrane. The descriptions of the central nervous system, the pancreas, and the cartilage are especially readable. A perfectionist might consider some 15 percent of the illustrating micrographs excellent and another 60 percent satisfactory and instructive; the remainder might recall the early days of electron microscopy. While substantial, the articles are not the definitive descriptions envisioned in the preface; nor do the illustrations set the standard of quality for beginners in electron microscopy, as the editor claims.

The book is printed on coated paper and is strongly bound. The reproduction of the plates is good; but that of the leading anatomical journals is better, owing to the use of higher resolution engravings or to more careful inking. As a supplement to histology textbooks this volume will have limited use, because it is not sufficiently comprehensive in its survey of the tissues. Moreover, as a result of recent revisions, the textbooks now include much on fine structure. Like a symposium volume, *Electron Microscopic Anatomy* will be consulted mostly for the sake of one or another of its articles. Those who read it through will appreciate the widespread contribution of electron microscopy to biological knowledge.

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Analytical Chemistry

Gas Analysis by Gas Chromatography. P. G. Jeffery and P. J. Kipping. Pergamon, London; Macmillan, New York, 1964. xii + 216 pp. Illus. $10.

Gas chromatography, an offspring of solution chromatography, is but 12 years old; the parent is 58. This precocious progeny has its own unique traits. In the parent, solution chromatography, the chromatogram is the sequential zones of the separated substances. In the offspring, gas chromatography, "the *chromatogram* is the plot of the detector response against either time or the volume of carrier gas." The sensitivity and the wide applicability of the detectors make gas chromatography more effective than solution chromatography, especially when applied with minute quantities of all kinds of substances. This characteristic, more than any other, facilitates the instrumentation and automation of the younger technique.

This book is another example of coordinated, basic studies produced in a laboratory devoted primarily to research. Both authors are "officers" of the Warren Spring Laboratory, a unit in Great Britain's Department of Scientific and Industrial Research.

The book was written for the analyst, as a guide to the analysis of gaseous mixtures. It consists of three parts: description of the apparatus (with chapters devoted to sample transfer or addition, columns and fillings, detectors, and the complete apparatus); methods for the determination of individual gases (with chapters on hydrogen, the noble gases, various common gases, the hydrocarbon gases, nitrogen compounds, sulfur compounds, halogen compounds, and miscellaneous compounds); and examples of separations (with chapters on complete analyses of gases, of gases in solids, of gases in liquids and vapors, and methods of sampling). The organization is a practical one that omits the common mechanistic or so-called theoretical considerations, which, at best, are inadequate, especially in explanation of separability or selectivity.

In the practical middle ground, the material in this publication should be most useful to those who are about to undertake analyses by gas chromatography for the first time. The book is a little too specialized for those with only a general interest in gas chromatography but not comprehensive enough for those now using gas chromatography. Many books and reviews on gas chromatography are not cited, nor is the *Journal of Gas Chromatography*. The extent of the commercial instrumentation of gas chromatography, an instrument business that now runs into many millions of dollars annually in the United States alone, is not indicated, although instrument makers issue a large number of publications, with pertinent data on sorbents, gas flow regulators, and special detectors.

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